

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application.

1. (Cancelled)

2. (Currently Amended) A cleaning composition for removing resists KrF excimer resist or ArF excimer resist from a substrate including a copper film, comprising a salt of hydrofluoric acid and a base not containing a metal (A component), a water-soluble organic solvent that is a mixture of amides and polyhydric alcohol or its derivatives (B1 component), at least one acid selected from the group consisting of organic acids and inorganic acids formic acid, acetic acid, propionic acid, butyric acid, oxalic acid, glycolic acid, tartaric acid, citric acid, benzoic acid, toluic acid, phthalic acid, sulfuric acid, hydrochloric acid, nitric acid and phosphoric acid (C component), water (D component), and an ammonium salt which is selected from the group consisting of aliphatic monocarboxylic acid ammonium salt, aliphatic polycarboxylic acid ammonium salt, oxycarboxylic acid ammonium salt and amino phosphonic acid ammonium salt (E1 component), the content of said salt of hydrofluoric acid and a base not containing a metal (the A component) being 0.01 – 1 mass % and said cleaning composition having a pH of 4-8.

3. (Cancelled)

4. (Currently Amended) The cleaning composition for removing resists according to claim [[1]] 2, wherein the base not containing a metal for forming the salt of hydrofluoric acid and a base not containing a metal (the A component) is at least one base selected from the group consisting of an organic amine compound, ammonia, and a lower quaternary ammonium base.

5. (Cancelled).

6. (Currently Amended) A cleaning composition for removing resists KrF excimer resist or ArF excimer resist from a substrate including a copper film, comprising a salt of

hydrofluoric acid and a base not containing a metal (A component), a water-soluble organic solvent that is a mixture of a sulfur-containing compound and polyhydric alcohol or its derivatives (B2 component), ~~phosphonic acid 1-hydroxyl ethylidene-1, 1-diphosphonic acid~~ (C1 component), water (D component), and a base not containing a metal which is selected from the group consisting of hydroxy amines, primary fatty amine, secondary fatty amine, tertiary fatty amine, alicyclic amine, heterocycle amine, aromatic amine, ammonia and lower quaternary ammonium base (E component), the content of said salt of hydrofluoric acid and a base not containing a metal (the A component) being 0.01 – 1 mass %, the content of said phosphonic acid (the C1 component) being 0.1 – 20 mass %, the content of said base not containing a metal (the E component) being 0.1 – 20 mass %, and said cleaning composition having a pH of 2-8.

7. (Cancelled).

8. (Currently Amended) A cleaning composition for removing ~~resists~~ KrF excimer resist or ArF excimer resist from a substrate including a copper film, comprising a salt of hydrofluoric acid and a base not containing a metal (A component), a water-soluble organic solvent that is a mixture of a sulfur-containing compound and polyhydric alcohol or its derivatives (B2 component), ~~phosphonic acid 1-hydroxyl ethylidene-1, 1-diphosphonic acid~~ (C1 component), water (D component), a base not containing a metal which is selected from the group consisting of hydroxy amines, primary fatty amine, secondary fatty amine, tertiary fatty amine, alicyclic amine, heterocycle amine, aromatic amine, ammonia and lower quaternary ammonium base (E component), and a Cu corrosion inhibitor (F component), the content of said salt of hydrofluoric acid and a base not containing a metal (the A component) being 0.01 – 1 mass %, the content of said phosphonic acid (the C1 component) being 0.1 – 20 mass %, the content of said base not containing a metal (the E component) being 0.1 – 20 mass %, and said cleaning composition has a pH of 2-8.

9. (Previously Presented) The cleaning composition for removing resists according to claim 8, wherein the Cu corrosion inhibitor (the F component) includes at least one selected from the group consisting of triazoles, aliphatic carboxylic acids, aromatic carboxylic acids, and amino carboxylic acids.

10. (Currently Amended) A method of manufacturing a semiconductor device, comprising:

forming a metal film having copper as its main component on a semiconductor substrate;

forming an insulating film on the metal film;

forming a resist film on the insulating film;

forming a hole or a trench in the insulating film by dry etching, using the resist film as a mask;

removing the resist film by gas plasma processing or heat treatment; and

removing remaining resist residue using the cleaning composition for removing resists according to claim [[1]] 2.

11. (Previously Presented) The method according to claim 10, wherein the resist film used as the mask in the dry etching is a chemically amplified excimer resist.

12. (Currently Amended) A method of manufacturing a semiconductor device, comprising:

forming a metal film having copper as its main component on a semiconductor substrate;

forming an insulating film on the metal film;

forming a resist film on the insulating film;

forming a hole or a trench in the insulating film by dry etching, using the resist film as a mask; and

removing the resist film and resist residue produced during the dry etching using the cleaning composition for removing resists according to claim [[1]] 2.

13. (Currently Amended) A method of manufacturing a semiconductor device, comprising:

forming a metal film having copper as its main component on a semiconductor substrate;

forming an insulating film on the metal film;

forming a hole in the insulating film reaching the metal film by dry etching; and
removing etching residue produced during the dry etching using the cleaning
composition for removing resists according to claim [[1]] 2.